DISCUSSION

The purpose of this paper is to examine the circumstances and settings associated with North Carolina drownings. A significant finding is the large number of non-swimming drownings. Many of the decedents in the study simply fell into the water, either from a boat while fishing or into a swimming pool while playing. These are people who apparently had no intention of getting wet, but suddenly found themselves in a lethal situation. Another significant finding is the large number of drownings occurring in small ponds, creeks, and rivers. With approximately 320 miles of shoreline and thousands of people swimming there each year, it is somewhat surprising that the Atlantic Ocean made such a small contribution to the total number of drownings in North Carolina.

The most profound results of this study, however, are the alcohol findings. Of the 839 drowning victims who were tested for blood alcohol, 283 or 34% had a blood alcohol concentration of 100 mg% or greater. This is equivalent to .10% blood alcohol, which under North Carolina law means the person is legally intoxicated. This level of intoxication was found in 38% of ages 15 years or older with the highest frequency evident among middle-aged males. Furthermore, in several types of activities and settings associated with drowning, blood alcohol concentrations of 100 mg% or greater were found in 33% or more of the drowning victims.

A shortcoming of this study is the absence of information about swimming ability. It would have been useful, for example, to identify what proportion of drowned persons were excellent, good, fair, or nonswimmers. The reason this was not undertaken was that the data in the Medical Examiner records pertaining to swimming ability were found to be too imprecise and also were too infrequently reported. Even if this information were accurate, it would not be possible to determine here the safety benefits of swimming ability per se. An epidemiologic study designed for that purpose would have to compare the abilities of swimmers who drown with those of uninjured persons exposed to similiar circumstances. (1)

Even with the absence of data on swimming ability, this study does suggest that some drownings are preventable. For example, most of the 126 drowning victims who were swimming or wading alone (see Appendix 2) might have been saved if the victims were swimming with someone who knew basic rescue techniques. This is why the American Red Cross (9) recommends never swimming alone, no matter how well you swim. The drownings that occurred while swimming or wading in a group might have been prevented if the victim had known how to recognize hazardous conditions and practices, such as swimming while intoxicated, or if others in the group knew of appropriate rescue techniques. Since the majority of these drownings occurred in the 10-24 age group, a water safety course either in grammar school or high school may be of some help.

Other drownings that were preventable were the 205 drownings that involved boats. Although information on personal flotation devices (PFD's) was not collected in this study, Shkrum (10) reportd that in 69% of the boating fatalities in North Carolina from 1981 to 1983, the victim was not wearing a PFD. The State of North Carolina can help reduce boat-related drownings by changing the law regarding PFD's. The current law states that for everyone in a boat there must be a coast guard approved PFD readily accessible [General Statute 75A-6 (F)]. However, if the law were changed to require everyone on a boat to *wear* an approved and appropriate PFD, it is probable that the number of boat-related drownings would decline. It should be noted that the American Red Cross (9) recommends that everyone wear a PFD, especially nonswimmers and novices.

Drownings that were clearly preventable are the 74 drownings in the 0-5 age group. Adult supervision would have had an immediate impact on these drownings, especially the ones that occurred in bathtubs and swimming pools. However, adequate supervision of children appears to be difficult to teach and impossible to legislate. (11) Waller (1) suggests that adequate fencing around swimming pools with a high, hidden, self-closing, and self-locking latch would be a preventive measure. Unfortunately, it is unknown how many children drowned in unfenced swimming pools. Rivara (11) suggests that swimming instruction for toddlers might help decrease the number of drownings in this group, but there is as yet no conclusive evidence to suggest that these "water baby" type programs are effective in preventing drowning deaths among the very young.

Some drownings that involve motor vehicle crashes are preventable because the majority of the victims were intoxicated. The recent enactment of tougher drinking-and-driving laws may help to reduce the number of these drownings. The State of North Carolina could also build more guardrails along roads bordering ditches and waterways and increase the spatial separation between roads and canals or other bodies of water in order to further reduce the number of motor vehicle crash drownings (12).

A statistic that suggests the need for additional therapeutic measures by first responders is the low percentage (33%) of resuscitation attempts among drownings that were witnessed. A possible reason for this is delay in the retrieval of the victim because of the inability to locate the body underwater. Rapid identification of persons in trouble underwater could be augmented by more visible swimwear, underwater lights in pools, and lights on boats (12). Maclachlan (13) suggests that another possible reason for the low percentage of resuscitation attempts among drowning victims may be a lack of knowledge by the public of emergency first aid procedures. A concerted campaign to increase the number of people with life-saving skills would probably help reduce the number of drownings.